MEMORANDUM TO: Ogden College of Science and Engineering Curriculum Committee

Dr. Melanie Autin
Dr. Nahid Gani
Dr. Scott Grubbs
Dr. Ting-Hui Lee
Dr. Andy Mienaltowski
Dr. Les Pesterfield
Dr. Todd Willian
Mr. Jason Wilson
Dr. Bangbo Yan

FROM: Dr. Stuart Burris, Chair

SUBJECT: Agenda for <u>Thursday, April 4, 2024</u>

A. OLD BUSINESS:

I. Consideration of the minutes of the March 2024 meeting.

B. NEW BUSINESS:

Type of item	Description of Item & Contact Information
Action	**Proposal to Revise a Program** Ref. 528: Mathematics, Bachelor of Arts Contact: Ngoc Nguyen, ngoc.nguyen@wku.edu, 270-421-9876

C. **OTHER BUSINESS**

Minutes – OCSE Curriculum Committee **March 2024**

Members Present:

Dr. Melanie Autin
Dr. Nahid Gani
Dr. Scott Grubbs
Dr. Ting-Hui Lee
Dr. Andy Mienaltowski
Dr. Les Pesterfield
Dr. Todd Willian
Mr. Jason Wilson
Dr. Bangbo Yan

Guests Present:

Dr. Leslie North
Dr. Paul Woosley

FROM: Dr. Stuart Burris, Chair

The meeting commenced on Thursday, April 4th at 4:00pm.

OLD BUSINESS:

The minutes from the March 2024 meeting were approved as presented.

NEW BUSINESS:

Action Agenda:

ANSC 232: Autin/Grubbs; approved
ANSC 362: Autin/Grubbs; approved
Ref. 508: Agriculture: Pesterfield/Gani; approved
GEOG 350: Grubbs/Willian; approved
GEOG 481: Autin/Grubbs; approved
EE 432: Willian/Autin; approved
SEAS 325: Autin/Grubbs; approved
Ref. 629P, 629: Computer Science: Autin/Lee; approved
Ref. 555P, 555: Computer Information Technology: Autin/Lee; approved
Ref. 537P, 537: Electrical Engineering: Gani/Lee; approved

Other Business:

Biology, Mathematics, Physics & Astronomy, and SEAS are due to elect or reelect representatives to serve on the curriculum committee next year.

The meeting adjourned at 4:29pm

Program Change Request

Date Submitted: 03/11/24 2:00 pm

Viewing: 528 : Mathematics, Bachelor of Arts

Last approved: 03/11/24 11:06 am

Last edit: 03/28/24 4:16 pm

Changes proposed by: ngc72640

Catalog Pages
Using this Program
Mathematics, Bachelor of Arts (528)

Proposed Action

Active

Contact Person

In Workflow

1. **MATH Approval**
2. **SC Dean**
3. SC Curriculum Committee
4. Undergraduate Curriculum Committee
5. University Senate
6. Provost
7. Program Inventory

Approval Path

1. 03/11/24 2:18 pm Kanita DuCloux (kanita.ducloux): Approved for MATH Approval

History

1. May 25, 2021 by Rheanna Plemons (rheanna.plemons)
2. Sep 27, 2021 by Jennifer Hammonds (jennifer.hammonds)
3. Mar 7, 2022 by Jessica Dorris (jessica.dorris)
4. Jul 20, 2022 by Ryan Wilson (ryan.wilson)
5. Apr 12, 2023 by Jennifer Hammonds (jennifer.hammonds)
6. Mar 11, 2024 by Patrick Brown (patrick.brown)

Name	Email	Phone
Ngoc Nguyen	ngoc.nguyen	270-421-9876

Term of Implementation	2024-2025
Program Reference Number	528
Review Type	Full Review
Academic Level	Undergraduate
Program Type	Major
Degree Types	Bachelor of Arts
Department	Mathematics
College	Science and Engineering
Program Name (eg. Biology)	Mathematics, Bachelor of Arts

Will this program have concentrations?
Yes

Concentrations

Concentrations

Fundamental Analysis & Discrete (MAAD)
Fundamentals of Applied Mathematics (MAAM)
Fundamentals of Math Studies (MAMS)

CIP Code	27.0101 - Mathematics, General.
Will this program lead to teacher certification?	No

Does the proposed program contain 25% or more new content not previously taught in another course at WKU? If yes, contact the Office of the Provost for additional SACSCOC proposal requirements

No

Catalog Content

Program Overview (Catalog field: Overview tab)

This major is for students that intend to pursue a graduate degree in mathematics, and/or intend to pursue employment in business and industry. This major does not lead to teacher certification.

Curriculum Requirements (Catalog field: Program Requirements)

Program Requirements (51 hours)

Approved Shared Content from /shared/undergraduate-major-requirements/
Last Approved: Jul 6, 2023 12:58pm

A baccalaureate degree requires a minimum of 120 unduplicated semester hours. More information can be found at www.wku.edu/registrar/degree_certification.php.
Students who began WKU in the Fall 2014 and thereafter should review the Colonnade requirements located at: https://www.wku.edu/colonnade/colonnaderequirements.php.

A major in mathematics provides a Bachelor of Arts degree and requires either a minimum of 36-39 semester hours for a general major with a minor or second major or a minimum of 51 semester hours for an extended major. Note: All mathematics courses listed as prerequisites for other mathematics courses must have been completed with a grade of "C" or better.

Students in the extended major (528) are required to satisfy a computational requirement by completing two courses chosen from CS 180, CS 290 , STAT 330, MATH 371, PHYS 316, or PHYS 318. [If MATH 371 is selected to fulfill this requirement, it cannot also be used as an elective in the extended major (528).]

To prepare for graduate study in mathematics, the student must complete a minimum of 51 hours of mathematics with the following requirements:

Core Courses

MATH 136	Calculus I	4
MATH 137	Calculus II	4
MATH 237	Multivariable Calculus	4
MATH 307	Introduction to Linear Algebra	3
MATH 310	Introduction to Discrete Mathematics	3
MATH 317	Introduction to Algebraic Systems	3
MATH 337	Elements of Real Analysis	3
MATH 431	Intermediate Analysis I	3
MATH 498	Senior Seminar	1-3
Total Hours		28-30

Select one of the following concentrations:

B1: Fundamentals of Analysis and Discrete Mathematics

MATH 417	Algebraic Systems	3
MATH 439	Topology I	3
MATH 450	Complex Variables	3
Select two of the following:		6
MATH 315	Course MATH 315 Not Found	
MATH 323	Geometry I	
MATH 415	Algebra and Number Theory	

MATH 423	Course MATH 423 Not Found	
MATH 473	Introduction to Graph Theory	
Select six elective hours from the following:		6
MATH 275	Introductory Topics in Mathematics (up to 3 hours)	
STAT 301	Introductory Probability and Applied Statistics	
MATH 305	Introduction to Mathematical Modeling	
MATH 315	Course MATH 315 Not Found	
MATH 323	Geometry I	
MATH 331	Differential Equations	
MATH 370	Applied Techniques in Mathematics	
MATH 371	Course MATH 371 Not Found (provided MATH 371 was not used to satisfy the computational requirement)	
MATH 382	Probability and Statistics I	
MATH 398	Seminar (up to 3 hours)	
MATH 405	Numerical Analysis I	
MATH 406	Numerical Analysis II	
MATH 409	History of Mathematics	
MATH 415	Algebra and Number Theory	
MATH 423	Course MATH 423 Not Found	
MATH 435	Partial Differential Equations	
MATH 470	Introduction to Operations Research	
MATH 473	Introduction to Graph Theory	
MATH 475	Selected Topics in Mathematics (up to 6 hours)	
MATH 482	Probability and Statistics II	
Total Hours		21

B2: Fundamentals of Applied Mathematics

MATH 331	Differential Equations [1]	3
MATH 370	Applied Techniques in Mathematics [1]	3
MATH 382	Probability and Statistics I [1]	3
MATH 405	Numerical Analysis I [1]	3
Select two of the following: [1]		6
MATH 305	Introduction to Mathematical Modeling	
MATH 406	Numerical Analysis II	

MATH 435	Partial Differential Equations	
MATH 470	Introduction to Operations Research	
MATH 482	Probability and Statistics II	
Select three credit hours of the following:		3
MATH 275	Introductory Topics in Mathematics	
STAT 301	Introductory Probability and Applied Statistics	
MATH 305	Introduction to Mathematical Modeling	
MATH 315	Course MATH 315 Not Found	
MATH 323	Geometry I	
MATH 371	Course MATH 371 Not Found (provided MATH 371 was not used to satisfy the computational requirement)	
MATH 398	Seminar	
MATH 406	Numerical Analysis II	
MATH 409	History of Mathematics	
MATH 415	Algebra and Number Theory	
MATH 417	Algebraic Systems	
MATH 423	Course MATH 423 Not Found	
MATH 435	Partial Differential Equations	
MATH 439	Topology I	
MATH 450	Complex Variables	
MATH 470	Introduction to Operations Research	
MATH 473	Introduction to Graph Theory	
MATH 475	Selected Topics in Mathematics	
MATH 482	Probability and Statistics II	
Total Hours		21

B3: Fundamentals of Mathematical Studies

MATH 450	Complex Variables	3
Select two of the following:		6
MATH 405	Numerical Analysis I	
MATH 406	Numerical Analysis II	
MATH 409	History of Mathematics	
MATH 415	Algebra and Number Theory	
MATH 417	Algebraic Systems	

MATH 423	Course MATH 423 Not Found	
MATH 435	Partial Differential Equations	
MATH 439	Topology I	
MATH 470	Introduction to Operations Research	
MATH 473	Introduction to Graph Theory	
MATH 482	Probability and Statistics II	
Select twelve elective hours of the following:		12
MATH 275	Introductory Topics in Mathematics (up to 3 hours)	
STAT 301	Introductory Probability and Applied Statistics	
MATH 305	Introduction to Mathematical Modeling	
MATH 315	Course MATH 315 Not Found	
MATH 323	Geometry I	
MATH 331	Differential Equations	
MATH 370	Applied Techniques in Mathematics	
MATH 371	Course MATH 371 Not Found (provided MATH 371 was not used to satisfy the computational requirement)	
MATH 382	Probability and Statistics I	
MATH 398	Seminar (up to 3 hours)	
MATH 405	Numerical Analysis I	
MATH 406	Numerical Analysis II	
MATH 409	History of Mathematics	
MATH 415	Algebra and Number Theory	
MATH 423	Course MATH 423 Not Found	
MATH 435	Partial Differential Equations	
MATH 470	Introduction to Operations Research	
MATH 473	Introduction to Graph Theory	
MATH 475	Selected Topics in Mathematics (up to 6 hours)	
MATH 482	Probability and Statistics II	
Total Hours		21

[1] Students may take certain 500-level mathematics courses for undergraduate credit in place of courses listed in items B1i, B1ii, B2i, B2ii, B3i, or B3ii with the approval of the mathematics department chair. No minor or second major for the extended major is required.

The Department of Mathematics offers a Joint Undergraduate Master's Program (JUMP) which provides academically outstanding students the opportunity to complete both an undergraduate Bachelor of Arts degree and a graduate Master of

Science degree in an accelerated timeframe. The MS in Mathematics prepares students to be competitive applicants for admission into a Ph.D. program and/or for positions where strong research skills are needed. Contact the graduate program coordinator for additional information, see https://catalog.wku.edu/graduate/science-engineering/mathematics/mathematics-ms/

This JUMP program allows students to start working toward their MS in Mathematics with a concentration in General Mathematics, Computational Mathematics, or Mathematical Economics (Ref: 085) while completing their Bachelor of Arts degree in Mathematics (Ref: 528 and 728) or a Bachelor of Science degree in Mathematical Economics (Ref: 731). Undergraduate students admitted into JUMP may take graduate courses that count toward both undergraduate and graduate degrees. Up to 12 credit hours can be double-counted toward both degrees, and up to 15 hours of graduate courses can be taken while a student is completing the undergraduate degree. The key benefit of the JUMP program is that it allows students to earn a bachelor's and a master's degree in an accelerated timeframe. For more information, see https://www.wku.edu/math/.

To be considered for admission to the JUMP program to earn a BA in Mathematics (or a BS in Mathematical Economics) and a MS in Mathematics in an accelerated timeframe, a student must meet the following requirements:

- Be a Mathematics or a Mathematical Economics major (includes programs with reference numbers 528, 728, and 731);
- Have completed at least 60 hours total, with at least 24 hours earned at WKU;
- Have at least 15 or more credit hours remaining to complete the bachelor's degree;
- Have completed or be enrolled in 15 credit hours in Mathematics;
- Have a minimum cumulative undergraduate GPA of 3.25;
- Have one of the following:
  - a. 3.25 GPA in the Mathematics or Mathematical Economics major AND a grade of B or higher in at least one of the courses: MATH 307, MATH 310, MATH 317, MATH 337, MATH 439;
  - b. 3.0 GPA in the Mathematics or Mathematical Economics major AND a grade of B or higher in at least two of the courses: MATH 307, MATH 310, MATH 317, MATH 337, MATH 439.

~~Fundamentals of Mathematical Studies~~

4-Year Plan

Fundamentals of Analysis & Discrete Mathematics Concentration

First Year

Fall	Hours	Spring	Hours
MATH 136	4	MATH 137	4
CS 180	4	CS 290, STAT 330, or MATH 371	3-4
ENG 100	3	COMM 145	3
Colonnade - Natural & Physical Sciences w/ lab	3-5	HIST 101 or HIST 102	3
		Colonnade - Social & Behavioral Science	3
	14-16		16-17

Second Year

Fall	Hours	Spring	Hours
MATH 307	3	MATH 237	4
MATH 310	3	Math upper-division Elective	3
ENG 200	3	Colonnade - Natural & Physical Sciences w/ no lab	3
Colonnade - Arts & Humanities	3	Colonnade - Writing in the Disciplines	3
World Language Requirement or General Elective	3	General Elective	3
	15		16

First Year

Fall	Hours	Spring	Hours

Third Year

Fall	Hours	Spring	Hours
MATH 317	3	MATH 337	3
Math upper-division Elective	3	MATH 417	3
Colonnade - Social & Cultural	3	Colonnade - Local to Global	3
Colonnade - Systems	3	General Elective	3
General Elective	3	General Elective	3
	15		15

Fourth Year

Fall	Hours	Spring	Hours
MATH 431	3	MATH 450	3
MATH 439	3	MATH 498	3
Math upper-division Elective	3	Math upper-division Elective	3
General Elective	3	General Elective	3
General Elective	2	General Elective	3
	14		15

Total Hours 120-123

Fundamentals of Applied Math Concentration

First Year

Fall	Hours	Spring	Hours
MATH 136	4	MATH 137	4
CS 180	4	CS 290, STAT 330, or MATH 371	3-4
ENG 100	3	COMM 145	3
Colonnade - Natural & Physical Sciences w/ lab	3-5	HIST 101 or HIST 102	3
		Colonnade - Social & Behavioral Science	3
	14-16		16-17

Second Year

Fall	Hours	Spring	Hours
MATH 307	3	MATH 237	4
MATH 310	3	MATH 331	3
ENG 200	3	Math upper-division Elective	3
Colonnade - Arts & Humanities	3	Colonnade - Natural & Physical Sciences w/ no lab	3
World Language Requirement or General Elective	3	Colonnade - Writing in the Disciplines	3
	15		16

Third Year

Fall	Hours	Spring	Hours
MATH 317	3	MATH 337	3
MATH 382	3	MATH 370	3
MATH 405	3	Colonnade - Local to Global	3
Colonnade - Social & Cultural	3	Colonnade - Systems	3
General Elective	3	General Elective	3
	15		15

First Year

Fall	Hours	Spring	Hours

Fourth Year

Fall	Hours	Spring	Hours
MATH 431	3	MATH 498	3
Math upper-division Elective	3	Math upper-division Elective	3
General Elective	3	General Elective	3
General Elective	3	General Elective	3
General Elective	2	General Elective	3
	14		15

Total Hours 120-123

Fundamentals of Math Studies Concentration

First Year

Fall	Hours	Spring	Hours
MATH 136	4	MATH 137	4
CS 180	4	CS 290, STAT 330, or MATH 371	3-4
ENG 100	3	COMM 145	3
Colonnade - Natural & Physical Sciences w/ lab	3-5	HIST 101 or HIST 102	3
		Colonnade - Social & Behavioral Science	3
	14-16		16-17

Second Year

Fall	Hours	Spring	Hours
MATH 307	3	MATH 237	4
MATH 310	3	Math upper-division Elective	3
ENG 200	3	Math upper-division Elective	3
Colonnade - Arts & Humanities	3	Colonnade - Natural & Physical Sciences w/ no lab	3
World Language Requirement or General Elective	3	Colonnade - Writing in the Disciplines	3
	15		16

Third Year

Fall	Hours	Spring	Hours
MATH 317	3	MATH 337	3
Math upper-division Elective	3	MATH 450	3
Colonnade - Local to Global	3	Math upper-division Elective	3
Colonnade - Social & Cultural	3	Colonnade - Systems	3
General Elective	3	General Elective	3
	15		15

Fourth Year

Fall	Hours	Spring	Hours
MATH 431	3	MATH 498	3
Math upper-division Elective	3	Math upper-division Elective	3
General Elective	3	General Elective	3
General Elective	3	General Elective	3
General Elective	2	General Elective	3
	14		15

First Year

Fall	Hours	Spring	Hours

Total Hours 120-123

Will this program be managed or owned by more than one department?

No

Does this program include courses from outside your department?

Please insert one Learning Outcome per box. Click green plus sign for additional LO boxes

Learning Outcomes and Measurement Plan

	List all student learning outcomes of the program.	Measurement Plan
SLO 1	Be prepared for employment in government, industry, or academic settings	Rubric measurement of their senior project in MATH 498 which consists of a 12-to-20-page paper and a 25-minute presentation of their senior project. Students will complete an exit survey. Request alumni to complete a post-graduation survey.
SLO 2	Use technology and apply mathematics to solve problems effectively.	Rubric measurement of their senior project in MATH 498 which consists of a 12-to-20-page paper and a 25-minute presentation of their senior project. Students will complete an exit survey. Request alumni to complete a post-graduation survey.
SLO 3	Utilize critical thinking and communicate ideas effectively.	Rubric measurement of their senior project in MATH 498 which consists of a 12-to-20-page paper and a 25-minute presentation of their senior project.

Assessment Template: https://www.wku.edu/academicaffairs/ee/assurance_learning_resources.php

Upload Assessment Plan

Delivery Mode

Is 25% or more of this program offered at a location other than main campus?

No

Enter Location(s) and Percentage of Program Offered at Location(s)

Is 50% or more of this program offered by distance education (online asynchronous, online synchronous, connected classrooms, etc.)?

No

Do you plan to offer 100% of this program online?

No

If no, enter the percentage of the program that will be taught online.

0

Do you plan to offer 100% of this program face-to-face?

Yes

Do you plan to offer at least 25% of this program as a direct assessment competency-based educational program?

No

See the SACSCOC Policy on Direct Assessment Competency-based Educational Programs.
https://www.sacscoc.org/pdf/081705/DirectAssessmentCompetencyBased.pdf

Library Resources

Attach library resources

Rationale for the program proposal?

The proposed revision is to add language to the Program Description about the Mathematics JUMP program.

Given the recent approval of a university-wide JUMP policy, the language being added brings our JUMP program in alignment with the policy.

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a. 3.25 GPA in the Mathematics or Mathematical Economics major AND a grade of B or higher in at least one of the courses: MATH 307, MATH 310, MATH 317, MATH 337, MATH 439;
b. 3.0 GPA in the Mathematics or Mathematical Economics major AND a grade of B or higher in at least two of the courses: MATH 307, MATH 310, MATH 317, MATH 337, MATH 439.

Additional Attachments

Additional information or attachments

Reviewer Comments

Key: 339